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United States Patent [19]

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Miller et al.

[45] Date of Patent: **Dec. 20, 1994**

[54] OBJECT POSITION DETECTOR

5,194,862 5/1993 Edwards 341/33

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[57] ABSTRACT

[21] Appl. No.: **115,743**

A proximity sensor system includes a sensor matrix array having a characteristic capacitance on horizontal and vertical conductors connected to sensor pads. The capacitance changes as a function of the proximity of an object or objects to the sensor matrix. The change in capacitance of each node in both the X and Y directions of the matrix due to the approach of an object is converted to a set of voltages in the X and Y directions. These voltages are processed by analog circuitry to develop electrical signals representative of the centroid of the profile of the object, i.e., its position in the X and Y dimensions. The profile of position may also be integrated to provide Z-axis (pressure) information.

[22] Filed: **Aug. 31, 1993**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 895,934, Jun. 8, 1992.

[51] Int. Cl.⁵ **G08C 21/00; H03M 11/00**

[52] U.S. Cl. **178/18; 341/33**

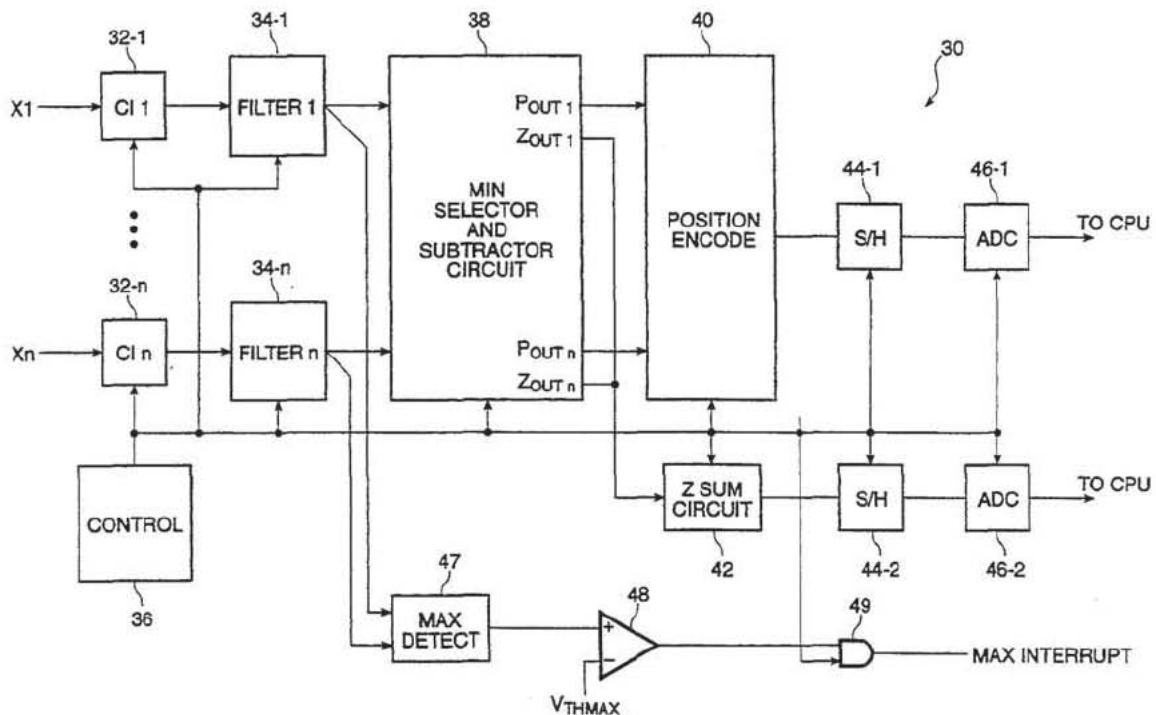
[58] Field of Search **178/18, 19; 345/173-178; 341/33, 34**

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U.S. PATENT DOCUMENTS

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10 Claims, 12 Drawing Sheets



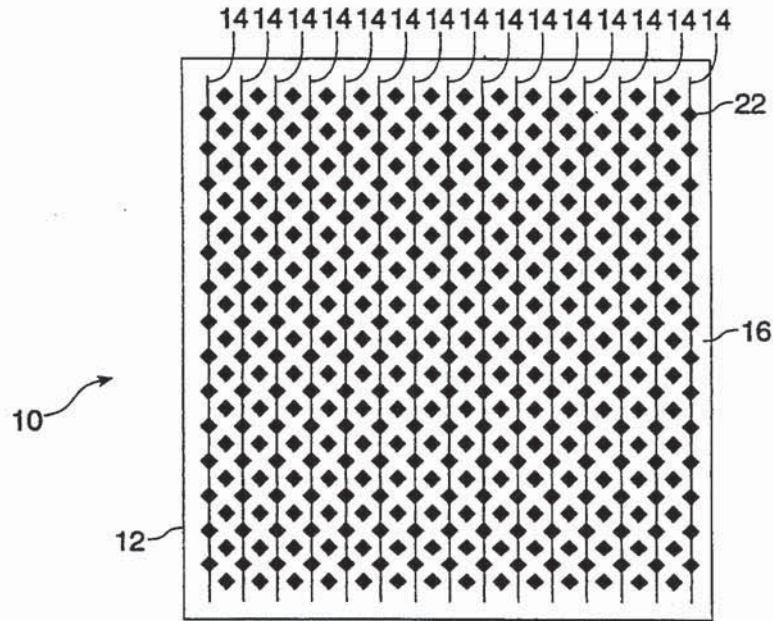


FIG. 1A

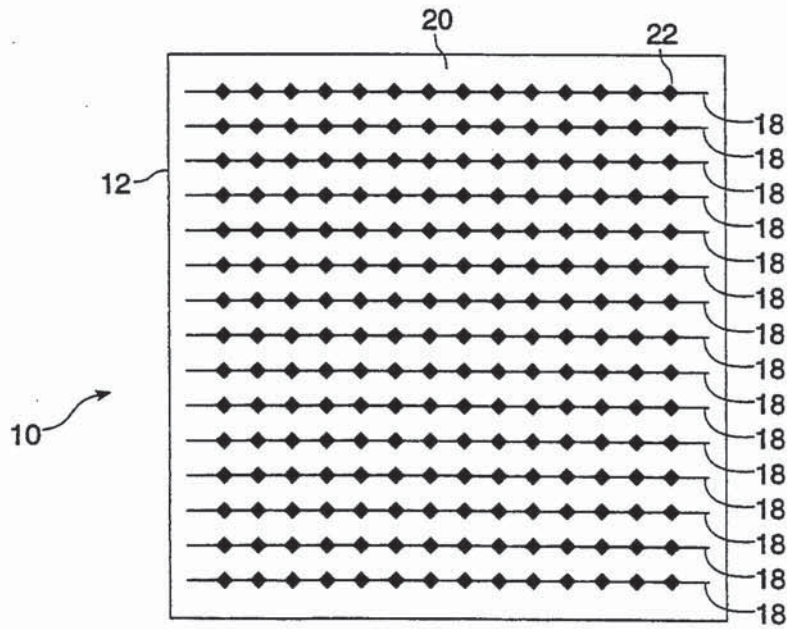


FIG. 1B

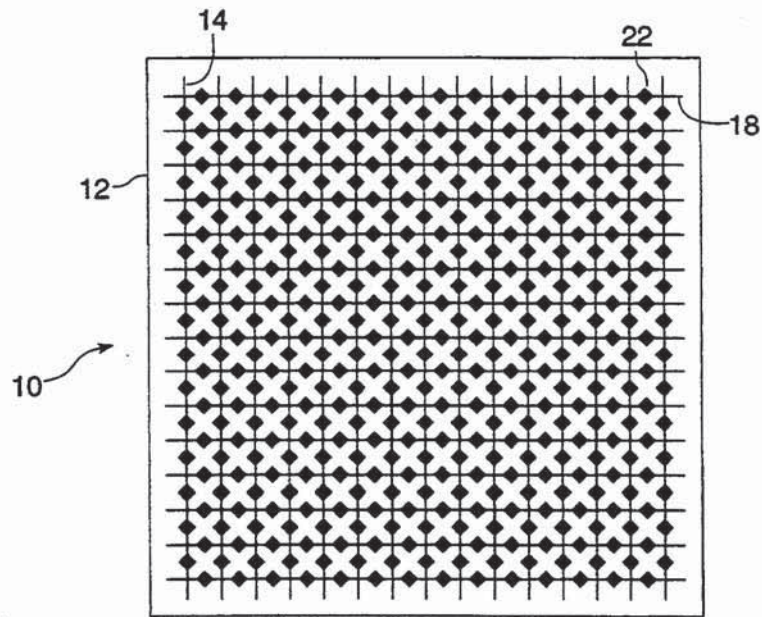


FIG. 1C

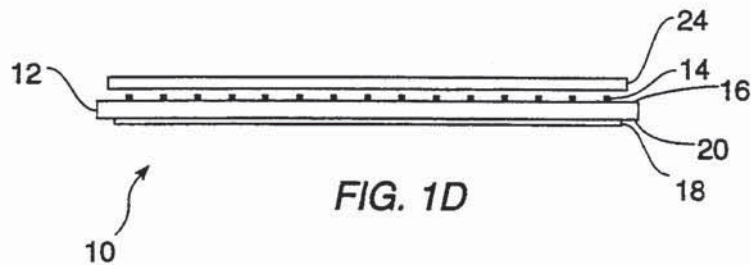
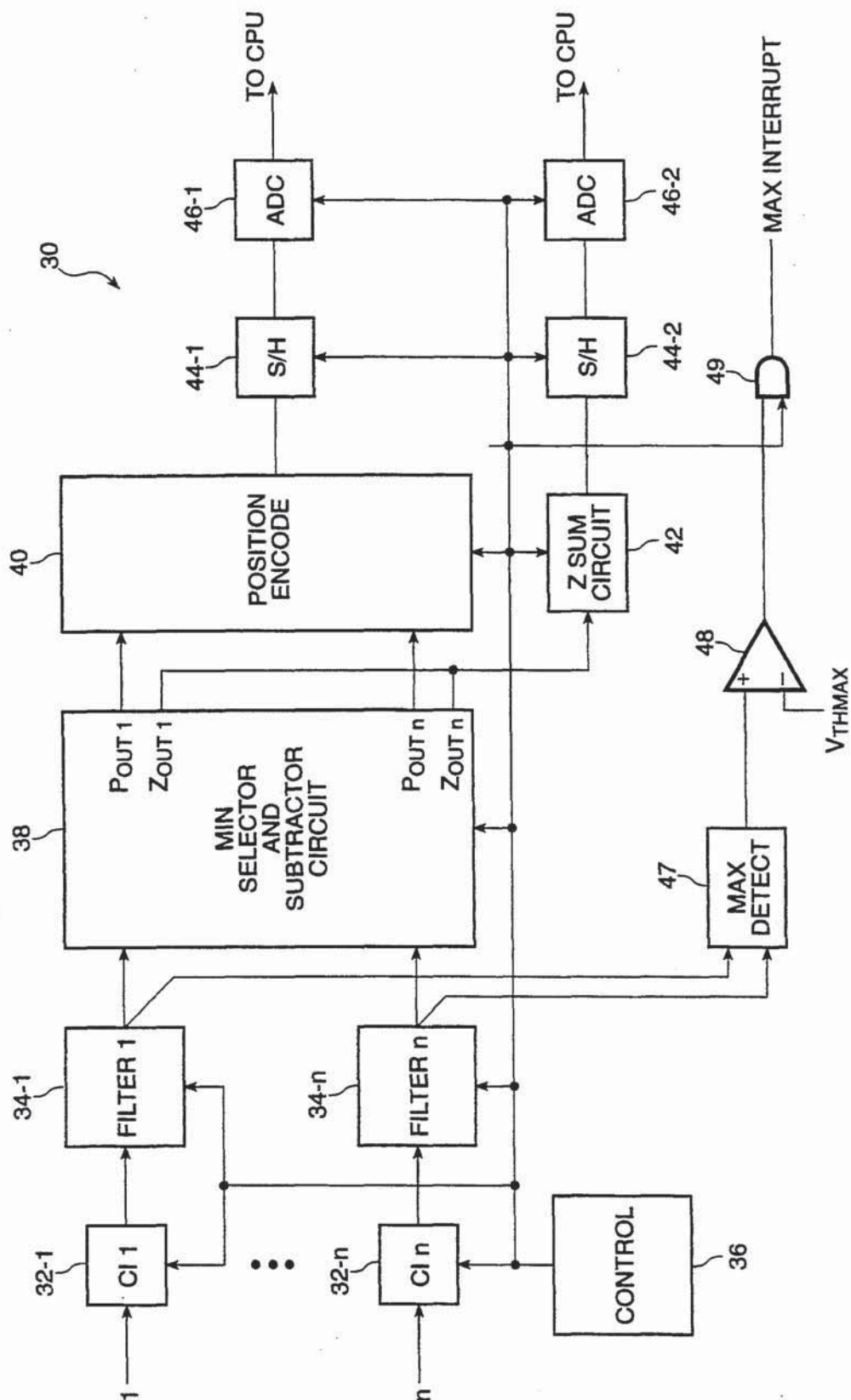


FIG. 1D



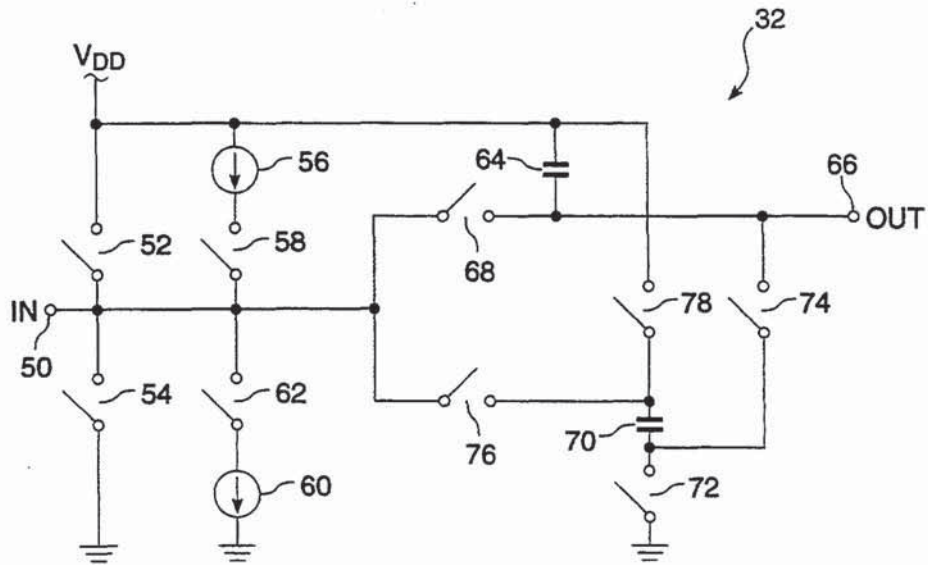


FIG. 3A

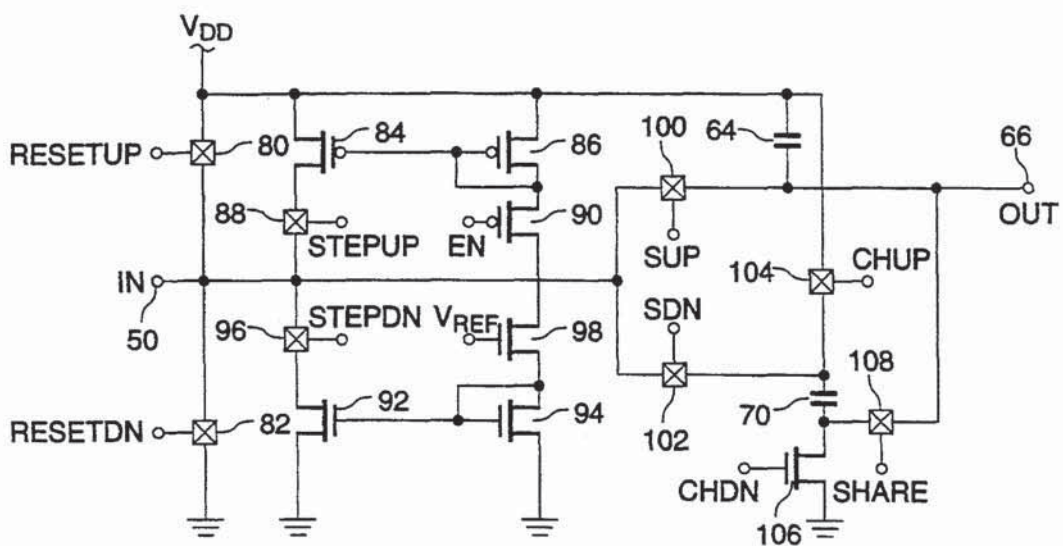


FIG. 3B

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